17 TRISTIMULUS COLORIMETER

A. A Minolta CR-221 tristimulus colorimeter, located in the Central Trace Laboratory, is used for color comparison support work. After turning on, the instrument will not take measurements until calibrated with the master White calibration plate (ch00). Supplemental Red, Orange, Yellow, Yellow-Green, Deep Pink, Purple, Cyan, and Brown standard plates (Calibration channels ch01 through ch09, respectively) are used to fine tune calibration according to the color of the samples.

B. Calibrate instrument to the closest Calibration plate by comparing representative sample measurements to color coordinate measurements present as target values in the instrument (the target values T00 through T09 have the same color space values entered as the respective Calibration Plates ch00 through ch09). The instrument is calibrated at each usage. After calibrations, reference and sample measurements are taken and compared by the operator. See the Colorimetry Worksheet (Appendix 19) for additional information.

C. Note: Instrument **KEYS** referenced below will be **IN BOLD FACE AND CAPITALIZED**.

a. Turn on instrument.

b. **CALIBRATE** on master White calibration plate (ch00) using Yxy **COLOR SPACE SELECT** (Note: The instrument will automatically adjust the values for the other (Supplemental) Calibration Plates (ch01 through ch09)).

c. Set **INDEX SET** to AUTO SELECTION N CAL ch00 (**ENTER** after changes).

d. Set **TARGET COLOR SELECT** to T00 (**BREAK** after changes).

e. Set **COLOR SPACE SELECT** to L*a*b*.

f. Set **ABS./DIFF**. to ABSOLUTE MEASUREMENT mode (Display will show L*a*b* values without an E value).

i. If ″PRINT:″ in **INDEX SET** is not set to ″Y″, values can be recorded by pressing **DISPLAY PRINT** after each measurement.

g. Measure sample (sample which will be used as the ″Reference″ that the ″Comparison″ sample(s) will be compared with).

h. Press **ABS./DIFF.** to toggle to the DIFFERENCE MEASUREMENT mode in order to display the **E** value (the Delta E in the L*a*b* COLOR SPACE).

i. Record the E value (**DISPLAY PRINT**).

j. Press **TARGET COLOR SELECT** and change to T01.

k. Press **ABS./DIFF.** and record the E value (**DISPLAY PRINT**).

l. Repeat steps 10 and 11 for T02 through T09.

m. Note the smallest E value for T00 through T09 (This indicates the Calibration Plate with the color space values closest to that of the Reference sample).

n. Perform a fresh Calibration of the Calibration plate with the lowest E value and any other plate(s) with an E value within 5.0 units using Yxy **COLOR SPACE SELECT**.

o. Repeat steps C.c. through C.f.i. (Note: in step C.g. measure in a different area).

p. If the same Calibration plate has the lowest E value, use it as the Calibration standard for the casework. If a different Calibration Plate is indicated, repeat steps 3 through 13 and choose the best 2 out of 3 (Note: 2 different Calibration standards are indicated due to the ″Reference″ sample color space values being midpoint between those of 2 Calibration Plates. In rare instances, more than 2 Calibration Plates can be indicated for similar reasons).

q. Set **INDEX SET** to AUTO SELECTION N CAL and set channel to the closest Calibration Plate as determined in step 16.

D. Case sample measurements and comparisons can now be made:

a. **PAGE** (for new data page).

b. Set **COLOR SPACE SELECT** to L*a*b*.

c. Set **ABS./DIFF**. to ABSOLUTE MEASUREMENT mode (Display will show L*a*b* values without an E value).

d. Measure sample 10 times (sample which will be used as the ″Reference″ that the ″Comparison″ sample(s) will be compared with).

e. Run **STATISTIC** for this page (ALL PAGES: N).

f. Set **TARGET COLOR SET** to mean value of ″Reference″ as determined in step 22. Set ″T″ to any value not being used (Note: T00 through T09 are already being used for calibration plates). Set ″ch″ for calibration plate previously determined to be closest (as determined in step 16). Note: Slight (insignificant) changes may occur to the mean value due to instrumental mathematical conversions.

g. **PAGE** (for new page).

h. Measure sample 10 times (sample which will be used as the ″Comparison″ sample).

i. Run **STATISTIC** for this page (ALL PAGES: N) Note: This will give statistics for the ″Comparison″ sample ABSOLUTE MEASUREMENT values since instrument is still in the ABSOLUTE MEASUREMENT mode.

j. Press **ABS./DIFF.** to change to DIFFERENCE MEASUREMENT mode (Display will show L*a*b* values with an E value).

k. Run **STATISTIC** for this page (ALL PAGES: N) Note: This will give statistics for DIFFERENCE MEASUREMENT values for the ″Comparison″ sample values verses the Target value (″Reference″ sample mean value as set in step 23).

l. Repeat steps D.g. through D.k. if needed for additional ″Comparison″ samples.

♦End